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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/707,979	01/29/2004	Brian T. Denton	BUR920030198US1	1978

29154 7590 01/08/2010

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EXAMINER	
FLEISCHER, MARK A	
ART UNIT	PAPER NUMBER
3624	

MAIL DATE	DELIVERY MODE
01/08/2010	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/707,979	DENTON ET AL.	
	Examiner	Art Unit	
	MARK A. FLEISCHER	3624	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *27 August 2009*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1, 2, 4 - 11, 13 - 17, 19 - 24, 26 and 27* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1, 2, 4 – 11, 13 – 17, 19 – 24, 26 and 27* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *29 January 2004* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date *24 November 2009*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Status of Claims

1. This non-final Office action is in reply to the Request for Continued Examination and amendments filed on 27 August 2009.
2. Claims 1, 2, 7, 8, 10, 15, 16, 21 and 23 have been amended.
3. Claims 3, 12, 18 and 25 have been cancelled.
4. Claims 1, 2, 4 – 11, 13 – 17, 19 – 24, 26 and 27 are currently pending and have been examined.

Continued Examination Under 37 CFR 1.114

5. A request for continued examination under 37 CFR §1.114, including the fee set forth in 37 CFR §1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR §1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR §1.114. Applicant's submission filed on 27 August 2009 has been entered.

Response to Amendments

6. Examiner maintains the objection to claim 1 for reasons set forth below.
7. The rejection of claim 3 under 35 U.S.C. §112, second paragraph is withdrawn in light of the claim's cancellation.
8. The rejection of claims 10, 16 and 23 under 35 U.S.C. §112, second paragraph are withdrawn in light of Applicant's amendments. Note however that these rejections have been changed to objections for reasons set forth below.
9. The rejection of claims 1 – 7 inclusive under 35 U.S.C. §101 are maintained for reasons set forth below. The remaining rejections under this section are withdrawn in light of Applicant's amendments.

Response to Arguments

10. Applicant's arguments received on 27 August 2009 have been fully considered but they are not persuasive. Referring to the previous Office action, Examiner has cited relevant portions of the references as a means to illustrate the systems as taught by the prior art. As a means of providing further clarification as to what is taught by the references used in the first Office action, Examiner has expanded the teachings for comprehensibility while maintaining the same grounds of rejection of the claims, except as noted above in the section labeled "Status of Claims." This information is intended to assist in illuminating the teachings of the references while providing evidence that establishes further support for the rejections of the claims.

11. Applicant argues, and points out that the cited prior art Hegde is geared towards Material Requirements Planning and "directed toward dividing each of a priority ranked scheduled releases (Material Requirements Planning (MRP)) into " N separate and smaller sized scheduled releases where the priority of each of the " N releases may be equal to the priority of the original release. The " N separate and smaller sized scheduled releases are sorted according to priority and then used to determine an optimal supply schedule for allocating resources including component supply and assembly capacity. The de Farias publication is directed toward applications of approximate linear programming to queuing problems and web server farm management." (Remarks, p.12). Applicant contrasts the instant invention by noting that it is directed toward "backorder costs penalties [which] are determined independently for each set of prioritized demands..." (Remarks, p.12). Examiner acknowledges these different purposes; however, the teachings regarding backorder costs and prioritization however are old and well-known and Examiner believes that the present invention is an obvious variation of what has been taught in the art. Indeed, the use of penalties and penalty functions are quite prevalent in the art as shown below and backorder costs have been specifically noted in the context of penalty parameters and functions as shown in Hegde [5,2] as acknowledged in Applicant's Remarks, p. 12. Hegde and Fakhouri further teach the setting of various types of priorities and Fakhouri in

particular teaches use of many types of priorities and resource allocations as shown below.

12. While Applicant makes some very cogent arguments with respect to backorder penalty costs and the prior art of Leachman in conjunction with those of Hegde and Fakhouri (Remarks, p.14), given the various forms of 112, 2nd rejections and the ways in which the claims can be interpreted, Examiner believes that the below prior art reads on the claims notwithstanding these Remarks. Applicant is therefore encouraged to set up a phone interview so that the claims can be thoroughly discussed and issues clarified in the interests of advancing prosecution.

Information Disclosure Statement

13. The Information Disclosure Statements filed on 24 November 2009 has been considered. An initialed copy of the Form 1449 is enclosed herewith.

Claim Objections

14. **Claims 1, 7, 8, 9, 10, 15, 16, 21 and 23** are objected to for informalities. Examiner notes with appreciation Applicant's attempt to clarify claim 1; however the claims as written still suffer from problems as noted in the previous Office action:

- **Claim 1,** for a typical example of the problematic language, now recites "allocating, by a computing device, resources to different prioritized demands..." (emphasis added) which again does not make sense. Examiner notes that allocation decisions may be made *based* on priorities or demands or even prioritized demand, but an 'allocation' is to and among **groups receiving such allocations** and not to 'priorities' or 'prioritized demands'. Entities receiving such allocations may *have* a prioritized demand, but it is not the 'demand', prioritized or not, that receives the allocation---it is **to an entity** or entities that may have, as an attribute, a demand value that is previously determined. The current phraseology makes the claim unclear and confusing as the claim does not clearly specify how the allocation decisions are made. In addition, the term "consistent with" in the claim is also rather vague.

Examiner notes that the claim was again amended, but in a similar vein as before, 'prioritized demand' does not cure the basic defect as to the meaning of what is being allocated and to what the allocation is rendered. Resources are allocated to entities that perhaps have priorities or associated demand, but not to priorities or to the 'demand' themselves. For purposes of examination, Examiner interprets the claim as allocations are based on sequentially computed solutions to groups with groups having higher priority levels first and that once a higher level allocation is made, the allocation to lower level ranking groups are made based on the current, remaining supply (*i.e.,* consistent with). One further point, in claim 21 for example, recites "allocating remaining resources to the remaining groups of prioritized demands..." Applicant should consider rephrasing such as "...groups having (or with) prioritized demands..." as a possible remedy. If this does not correspond to what Applicant intended, Applicant should otherwise clarify this issue.

- **Claim 9** recites "... for each iteration.", where the conjunction of the term with that of 'linear programming model' is confusing. Applicant should consider using the term 'cycle' or 'stage' or further explain how the term 'iteration' is appropriate.
- **Claims 10, 16 and 23,** as amended, recite that a "model uses as a starting point a program solution" of the previous..." wherein results can mean the values of the decision variables used as constraints, or the values of the optimal solution of the previous stage. The term 'solution' is vague and indefinite. Solutions or results to a linear program encompass the optimal objective function value and/or the optimal values of the decision variables (independent variables) and appears to be at issue. Does the linear programming formulation use the 'solution' as a constraint? How is this 'use' accomplished and what specifically is being used? What does 'starting point' actually refer to? Does it mean the initial linear program, or the solution of the initial linear program? It appears that a prior allocation of resources per the solution of a linear program results in less available resources, such availability being determinable given the solution of the previous linear program, and this is the manner in which the Examiner interprets the claims.

Claim Rejections - 35 USC § 112

15. The following is a quotation of the second paragraph of 35 U.S.C. §112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

16. Claims 1, 5, 7, 8, 10, 15, 16, 21 and 23 are rejected under 35 U.S.C. §112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

- **Claims 1, 7, 8, 15 and 21:** numerously recite that an allocation is effected, but the entity to which something is allocated is unclear and vague. In claim 1, for example, there is an allocating step where resources are allocated "to different prioritized demands..." and "allocating....a range of ... backorder costs" where it continues "... to which resources are ... being allocated.", and "...group(s) of prioritized demands"... This phraseology is confusing and nonsensical as further amplified in the claim objections above. It would appear that the term 'allocating', for instance, is incorrectly used and that the proper term would be 'assigning' or 'associating' where some demand value is associated with an entity receiving an allocation. The notion of allocating, which reasonably refers to a resource to be allocated, 'a range of [ ] backorder costs...' also makes no sense as a backorder cost is not a resource. Consequently, these claims are vague and indefinite.
- **Claim 5:** This claims recites "...solution to subsequent iterations are consistent with previous solutions.", where the term consistent can be interpreted in numerous ways, hence renders the claim vague and indefinite. In the context of iterations, the term 'consistent' could refer to the fact that a
- **Claims 10, 16 and 23:** These claims recite the phrase 'as a starting point' and is vague and indefinite because 'starting point' can refer to different things as elaborated above in the objections which are incorporated herein by this reference.

Claim Rejections - 35 USC § 101

17. 35 U.S.C. §101 reads as follows:

> Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

18. Claims 1 – 7 are rejected under 35 U.S.C. §101 because the claimed invention is directed to non-statutory subject matter. Based on Supreme Court precedent, and recent Federal Circuit decisions, the Office's guidance to examiners is that a §101 process must (1) be tied to another statutory class (such as a particular apparatus) or (2) transform underlying subject matter (such as an article or materials) to a different state or thing. *Diamond v. Diehr*, 450 U.S. 175, 184 (1981); *Parker v. Flook*, 437 U.S. 584, 588 n.9 (1978); *Gottschalk v. Benson*, 409 U.S. 63, 70 (1972); *Cochrane v. Deener*, 94 U.S. 780,787-88 (1876). A method/process claim that fails to meet one of the above requirements is not in compliance with the statutory requirements of 35 U.S.C. §101 for patent eligible subject matter. Examiner notes with appreciation that most issues under §101 have been addressed; however, the limitation in claim 1 of the amended language regarding the step "*allocating, by each successive linear programming model, a range of said backorder costs within a priority group to which resources are currently being allocated.*" still indicates the absence of a substantive tie to another statutory class, namely some phraseology indicating use of a computer.

Claim Rejections - 35 USC § 103

19. The following is a quotation of 35 U.S.C. §103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

20. Claims 1, 2, 5, 6, 8, 9, 15, 21 and 22 are rejected under 35 U.S.C. §103(a) as being unpatentable over Hegde, et al. (US 7197469 B2) in view of de Farias (*The Linear Programming Approach To Approximate Dynamic Programming: Theory And Application*) and further in view of Fakhouri, et al. (US 746147 B1).

Claims 1, 8, 15 and 21:

Although claims 1, 8, 15 and 21 are worded and/or structured slightly differently, they have the same scope and so are addressed together. Hegde teaches the following limitations as shown.

- *allocating, by a computing device, resources* (Hegde [abstract] teaches "allocating resources including component supply…") *to different prioritized demands* (Hegde [4,31] states "allocating resources sequentially at each level based on a priority ranking…" (emphasis added)) *by iteratively solving mathematical linear programs* (Hegde [12,19] refers to iteration and Hegde [4,31] teaches using "linear programming"),
- *optimizing, by said computing device, each mathematical linear program according to one of a plurality of sets of prioritized demands wherein each set contains a plurality of prioritized demands* (Hegde in at least [2,50], *inter alia* teaches a method for optimizing associated with "demand prioritization techniques". Hegde [6,60] refers to a match between assets and demands based on "specified levels of the Bill of Materials..." which corresponds to the *plurality of sets of...*),
- *determining, by said computing device, each iterative solution using results from a previous mathematical linear program solution* (Hegde [abstract] teaches a system and method "for the optimal allocation of supply and capacity over time that satisfy two key requirements (a) being consistent with accepted operational objectives (e.g. low inventory, short lead times, prioritized allocation of supply and capacity) […]" (emphasis added) where the consistency is with the previous allocation hence consistent with the previous solution.);
- *outputting, by said computing device, said production plan based on optimizing said each mathematical linear program and determining each iterative solution* (Hegde [abstract] refers to a feasible production schedule, and in [11,13] refers to an output of the production scheduling

system. Hegde in [4,8] refers to use of linear programming techniques which are used to compute the production plan),

- *independently determining backorder costs penalties for each set of prioritized demands using said computing device* (Hegde [5,5] refers to back ordering as a typical element of BCD (Best Can Do) which uses linear programming as described in Hegde [4,26-7]. Note that in Hegde [5,7] states "material releases of equal priority have equal cost penalties ..." thus contemplates prioritization associated "with rationing resources", hence is associated with prioritized demands, but see below.)*; and*
- *allocating, by each successive linear programming model, a range of said backorder costs within a priority group to which resources are currently being allocated* (Hegde [13,30] *inter alia* describes in Hegde claims 1 – 3 a grouping process based on priority. Hegde [5,2-7] states "As is known, LP used in BCD is formulated as a cost minimization problem where the objective function is comprised of costs for processing, shipping, back ordering, inventory holding, and material substitution, as well as negative revenues, all of which are linear in their respective decision variables." Note that Hedge does not teach that such groups are assigned backorder costs *per se*, but as shown above, Hedge [5,5] does describe costs for backordering and the need to match assets with demand –[2,17]–, and the rationing of resources among competing demands –[1,25]).

Hegde does not specifically teach

- *aggregating, by said computing device, said prioritized demands into different priority groups;*
- *allocating, by said computing device, said resources to the highest priority group of prioritized demands using a first linear programming model;*
- *allocating, by said computing device, remaining resources to the next highest priority group of prioritized demands using a second linear programming model, wherein said second linear programming model uses results from said first linear programming model; and*
- *repeating said process of allocating remaining resources, by said computing device, to the remaining groups of prioritized demands in order of priority, and*

but de Farias, in an analogous art, does and teaches use of "approximate dynamic programming" wherein problems are segregated into stages (de Farias [p.98] refers to priorities wherein priority levels serve as stages) that are solved iteratively by linear programming problem formulations. de Farias [p.857] also refers to the "outcome of the approximate LP" which corresponds to *outputting…* and on [p.860] *inter alia* states "The first example illustrates how state-relevance weights influence the solution of the approximate LP.", and further displays an example of such solution. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to combine the teachings of Hegde and de Farias so that optimal allocations can be made among a plurality of based on priority levels.

Neither Hegde nor de Farias specifically teach that allocations are made based on demand priorities, or *independently determining backorder costs penalties for each set of prioritized demands using said computing device,* but Fakhouri, in an analogous art, does. Fakhouri [29,23] states "In such environments, multiple independent decision support systems can co-exist in a cooperative and/or hierarchical manner." (emphasis added). Fakhouri [38,36] *inter alia* states "In brief, we obtain an integer solution by solving a linear relaxation of the ILP described above, and then heuristically converting the optimal factional solution to obtain an integer solution. Having obtained an optimal fractional solution, we convert it into an integer solution in stages, at each stage "fixing" the values of variables that have been rounded in previous stages. We tackle lower-level resource before those that depend on them. In every iteration, we identify a few resources and their associated variables. We apply the integrality constraint for those variables to obtain an ILP with a relatively small number of integrality constraints. We solve this ILP, extract the values of the selected variables from the solution, and fix those values for their respective variables for all subsequent iterations. We continue this process till we arrive at a fully integral solution." (emphasis added)). Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to combine the teachings of Hegde and Fakhouri because both refer to resource allocation decisions that are prioritized in a hierarchical fashion and one of ordinary skill in the art would have had the technical capability to combine these teachings which would have had predictable outcomes.

Claim 2:

Hegde teaches the following limitations as shown.

- *said prioritized demands are hierarchical and comprises two or more levels of hierarchy* (Hegde [2,60] teaches a set of hierarchical tiers and based on priority allocations (Hegde [abstract]).

Claim 5:

Hegde does not specifically teach

- *adding constraints to said mathematical linear programs at each iteration to ensure that solutions to subsequent iterations are consistent with previous solutions,* but Examiner takes as a**dmitted prior** a**rt** that it is old and well-known as well as common place in the mathematical sciences that mathematical programs, and in particular, dynamic programming problems are problems that are posed in a well-defined formulation wherein adding additional constraints in one stage maintains feasibility in the previous stage or within the problem definition without the additional constraint. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to add additional constraints indicating the allocation of supply for that stage and wherein such additional constraint by definition maintains feasibility with the previous stage.

Claim 6:

Hegde teaches the following limitations as shown.

- *said method uses a different mathematical linear program for each iteration* (Hegde [2,10] refers to multiple stages.) Hedge does not specifically state that there is a new linear program for each iteration (stage), but Examiner takes as a**dmitted prior** a**rt** that it is old and well-known as well as common place in the dynamic programming sciences to use a new formulation of a linear program by adding constraints based on prior allocations and such new constraints, *ipso facto,* result in a different mathematical linear program. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to combine the teachings of Hegde, and what is old and well-known in the art as the use of optimization techniques such as linear programming sequentially applied to prioritized groups in a hierarchy would promote optimal resource allocations to such higher priority groups and one of ordinary skill in the art would have

had the technical capability to combine these teachings which would have had predictable outcomes.

Claims 9 and 22:

Hegde teaches the following limitations as shown.

- *when repeating said process of allocating remaining resources, said method uses a different linear programming model for each iteration* (see the rejection of claim 6). Hedge does not specifically state that there is a new linear program for each iteration (stage), but de Farias, in an analogous art does. de Farias teaches use of approximate dynamic programming (DP) wherein each stage in the DP is approximately solved by formulating an associated linear program (LP) and using the allocation obtained to determine the resource quantities available for the succeeding stages (priority groups) which are similarly formulated as LPs but with different constraints owing to the prior allocation. Moreover, Examiner takes **as admitted prior art** that it is old and well-known as well as common place in the dynamic programming sciences to use a new formulation of a linear program by adding constraints based on prior allocations and such new constraints, *ipso facto,* result in a different mathematical linear program. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to combine the teachings of Hegde, and what is old and well-known in the art as the use of optimization techniques such as linear programming sequentially applied to prioritized groups in a hierarchy would promote optimal resource allocations to such higher priority groups and one of ordinary skill in the art would have had the technical capability to combine these teachings which would have had predictable outcomes.

21. Claims 4, 7, 10, 11, 13, 14, 16, 17, 19, 20, 23, 24, 26 and 27 are rejected under 35 U.S.C. §103(a) as being unpatentable over Hegde, et al. (US 7197469 B2) in view of de Farias (*The Linear Programming Approach To Approximate Dynamic Programming: Theory And Application*) and further in view of Fakhouri, et al. (US 746147 B1) and further in view of Leachman, et al.

(*IMPReSS: An Automated Production-Planning and Delivery-Quotation System at Harris Corporation-Semiconductor Sector*).

Claim 4:

Hegde does not specifically teach the following limitations as shown, but Fakhouri, in an analogous art, does.

- *said mathematical linear programs solved in each iteration use the solution to the previous mathematical linear program as a starting solution* (Fakhouri [36,18] states "A scheme for performing the allocation of various resources based on the values for the various resources in the integer solution solution [*sic*] obtained in the previous step." See also the rejection of claim 3 above.).

Examiner takes **admitted prior art** that it is old and well-known as well as common place in the management sciences that decision/allocation problems with multiple stages are often posed as dynamic programming problems wherein each stage provides the starting point or allocation for the next stage. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to combine the teachings of Hegde, Fakhouri and Leachman and what is old and well-known in the art as the use of optimization techniques such as linear programming sequentially applied to prioritized groups in a hierarchy would promote optimal resource allocations to such higher priority groups and one of ordinary skill in the art would have had the technical capability to combine these teachings which would have had predictable outcomes.

Claim 7:

Hegde does not specifically teach the following limitations as shown, but Fakhouri, in an analogous art, does.

- *said allocating process solves said mathematical linear programs for higher prioritized demands before solving for lower priorities* (Fakhouri [5,14] states "For example, if two resources depend on a resource that can only support one of them, then one way to resolve the conflict is to allocate the scarce resource to the resource with higher priority.").

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to combine the teachings of Hegde and Fakhouri and what is old and well-known in the art as the use of optimization techniques such as linear programming sequentially applied to prioritized groups in a hierarchy would promote optimal resource allocations to such higher priority groups before lower priority groups and one of ordinary skill in the art would have had the technical capability to combine these teachings which would have had predictable outcomes.

Claims 10, 16 and 23:

Hegde does not specifically teach the following limitations as shown, but Fakhouri, in an analogous art, does.

- *each different linear programming model uses as a starting point a program solution of the previous linear programming model* (see the rejection of claims 3 and 4 which cite Fakhouri regarding lower-level resource allocations.).

Examiner takes **as admitted prior art** that it is old and well-known as well as common place in the management sciences that decision/allocation problems with multiple stages are often posed as dynamic programming problems wherein each stage provides the starting point or allocation for the next stage. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to combine the teachings of Hegde, Fakhouri and Leachman and what is old and well-known in the art as the use of optimization techniques such as linear programming sequentially applied to prioritized groups in a hierarchy would promote optimal resource allocations to such higher priority groups and one of ordinary skill in the art would have had the technical capability to combine these teachings which would have had predictable outcomes.

Claims 11, 17 and 24:

Hegde does not specifically teach the following limitations as shown, but Fakhouri, in an analogous art, does.

- *during said allocating processes, each linear programming model fixes variables associated with priority groups that have a lower priority than the priority group to which the resources are currently being allocated* (Fakhouri [38,40-2] teaches fixing variables according to the solutions of

previous stages.). Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to combine the teachings of Hegde and Fakhouri because both refer to resource allocation decisions that are prioritized in a hierarchical fashion and wherein resource allocation decisions associated with higher priority, hence established in earlier stages are fix thereby adding constraints so that subsequent formulations remain feasible for earlier ones and one of ordinary skill in the art would have had the technical capability to combine these teachings which would have had predictable outcomes.

Claims 13, 19 and 26:

Hegde teaches the following limitation as shown.

- *dividing said priority groups into different sub-priority tiers* (Hegde [2,36] teaches a tiered planning system and where each tier comprises a range such as "3 months to 7 yr" (Hegde [2,42]) which constitute a set of sub-priority levels. See also Hegde [16,34-38] which teaches "additional level of priority").

Claims 14, 20 and 27:

Hegde, does not specifically teach *said sub-priority tiers can be processed simultaneously,* but Fakhouri, in an analogous art, does. Fakhouri [4,55] teaches satisfying multiple constraints simultaneously, and in [26,15] states "Tasks are defined such that (a) each task is computationally significant as to the bookkeeping costs of managing parallelism" (emphasis added) where 'parallelism' indicates simultaneous processing. Furthermore, Examiner takes **as admitted prior art** that it is old and well-known as well as common place in the data processing arts to enable processes to be performed either separately or in parallel, *i.e.,* simultaneously. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to enable separate or simultaneous processing of resource allocation decisions depending on what is necessary and convenient and one of ordinary skill in the art would have had the technical capability to combine these teachings which would have had predictable outcomes.

Conclusion

Any inquiry of a general nature or relating to the status of this application or concerning this communication or earlier communications from the Examiner should be directed to **Mark A. Fleischer** whose telephone number is **571.270.3925.** The Examiner can normally be reached on Monday-Friday, 9:30am-5:00pm. If attempts to reach the examiner by telephone are unsuccessful, the Examiner's supervisor, **Bradley Bayat** whose telephone number is **571.272.6704** may be contacted.

The prior art made of record and not relied upon that is considered pertinent to applicant's disclosure are:

- Hegde, et al. (US 6701201 B2)
- Huang, et al. (US 6151582 A)
- Howie, et al. (US 5093794 A)
- de Farias, D., et al. (*The Linear Programming Approach To Approximate Dynamic Programming*).

and teach various forms of resource allocation and/or optimization using multi-stage linear programming techniques deemed relevant by the Examiner.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://portal.uspto.gov/external/portal/pair <http://pair-direct.uspto.gov >. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at **866.217.9197** (toll-free).

Any response to this action should be mailed to:

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